WHAT IS CLAIMED IS:

1. A chelate-forming material comprising:

a crosslinked polymeric bead having bound chelate-forming groups and a volume capacity of about 1.5 mmol/mL or less, wherein the chelate-forming groups comprise protonated N-methyl-D-glucamine, and have the capability of forming a chelate with As(V) and/or compounds thereof.

2. The chelate-forming material of claim 1, wherein the crosslinked polymeric bead has a volume capacity of about 1.3 mmol/mL or less.

3. The chelate-forming material of claim 1 or 2, wherein the crosslinked polymeric bead comprises poly(vinylbenzylchloride).

The chelate-forming material of claim 1 or 2, wherein the crosslinked polymeric bead comprises poly(glycidyl methacrylate).

4. The chelate-forming material of claim 1 or 2, wherein the crosslinked polymeric bead comprises chloromethylated polystyrene.

5. The chelate-forming material of any one of claims 1 to 4, wherein the crosslinked polymeric bead comprises a polymerized bi-, tri-, or tetra-functional monomer, or any combination thereof.

6. The chelate-forming material of claim 5, wherein the bi-, tri-, or tetra-functional monomer is selected from the group consisting of ethylene glycol diacrylate, di(ethylene glycol) diacrylate, tetra(ethylene glycol) diacrylate, ethylene glycol dimethacrylate, di(ethylene glycol) dimethacrylate, tri(ethylene glycol) dimethacrylate, butanediol diacrylate, hexanediol diacrylate, N,N-methylenebisacrylamide, N,N-(1,2-dihydroxyethylene) bisacrylamide, and divinylbenzene, or any combination thereof.

7. The chelate-forming material of any one of claims 1-6, wherein the protonated N-methyl-D-glucamine is in chloride form.

8. The chelate-forming material of any one of claims 1-6, wherein the protonated N-methyl-D-glucamine is in sulfate form.

9. The chelate-forming material of any one of claims 1-8, wherein the crosslinked polymer bead has a nitrogen content on a dry weight basis of about 2.4 mmol/gm or more.

10. The chelate-forming material of claim 9, wherein the crosslinked polymer bead has a nitrogen content on a dry weight basis of about 2.5 mmol/gm or more.

11. The chelate-forming material of any one of claims 1-10, wherein the crosslinked polymer bead has a crosslinking ratio in the range of from about 2% to about 5%.

12. The chelate forming material of claim 11, wherein the bead is prepared using divinylbenzene or ethylene glycol dimethacrylate as a crosslinking agent.

13. The chelate-forming material of any one of claims 1-12, wherein the crosslinked polymer bead has a crosslinking ratio in the range of from about 2% to about 7%.

14. The chelate forming material of claim 13, wherein the bead is prepared using ethylene glycol dimethacrylate as a crosslinking agent.

15. A chelate-forming material comprising:

a crosslinked polymeric bead having bound chelate-forming groups and a nitrogen content on a dry weight basis of about 2.4 mmol or more, wherein the chelate-forming groups comprise protonated N-methyl-D-glucamine and have the capability of forming a chelate with As(V) and/or compounds thereof.

16. A method for treating an arsenic-containing aqueous fluid comprising:

contacting an As(V)-containing aqueous fluid with crosslinked polymeric beads each having bound chelate-forming groups, and a volume capacity of about 1.5 mmol/mL or less and/or a nitrogen content on a dry weight basis of about 2.4 mmol/g or more, wherein the chelate-forming groups comprise protonated N-methyl-D-glucamine and have the capability of forming a chelate with As(V) and/or compounds thereof;

forming the chelate with As(V) and/or a compound thereof; and

separating the chelated As(V) and/or compound thereof from the fluid.

17. The method of claim 16, wherein the crosslinked polymeric beads each have a volume capacity of about 1.3 mmol/mL or less.

18. The method of claim 16 or 17, wherein the crosslinked polymeric beads each have a nitrogen content on a dry weight basis of about 2.5 mmol/gm or more.

19. The method of any one of claims 16-18, wherein the crosslinked polymeric beads comprise poly(vinylbenzylchloride).

20. The method of any one of claims 16-19, wherein the crosslinked polymeric beads comprise poly(glycidyl methacrylate).

21. The method of any one of claims 16-19, wherein the crosslinked polymeric beads comprise chloromethylated styrene.

22. The method of any one of claims 16-21, wherein the crosslinked polymeric bead comprises a polymerized bi-, tri-, or tetra-functional monomer, or any combination thereof.

23. The method of claim 22, wherein the bi-, tri-, or tetra-functional monomer is selected from the group consisting of ethylene glycol diacrylate, di(ethylene glycol) diacrylate, tetra(ethylene glycol) diacrylate, ethylene glycol dimethacrylate, di(ethylene glycol) dimethacrylate, tri(ethylene glycol) dimethacrylate, butanediol diacrylate, hexanediol diacrylate, N,N-methylenebisacrylamide, N,N-(1,2-dihydroxyethylene) bisacrylamide, and divinylbenzene, or any combination thereof.

24. The method of any one of claims 16-23, wherein the protonated N-methyl-D-glucamine is in chloride form.

25. The method of any one of claims 16-23, wherein the protonated N-methyl-D-glucamine is in sulfate form.

26. The method of any one of claims 16-25, wherein the arsenic-containing aqueous fluid is groundwater.

27. A process for preparing a chelate-forming crosslinked polymeric bead having a volume capacity of about 1.5 mmol/mL or less and/or a nitrogen content on a dry weight basis of about 2.4 mmol/g or more, wherein the bead is comprised of a crosslinked polymer bound to chelate-forming groups, comprising;

obtaining a crosslinked polymeric bead having functional groups;

reacting the functional groups with N-methyl-D-glucamine; and

producing a protonated N-methyl-D-glucamine.

28. The process of claim 27, wherein the chelate-forming crosslinked polymeric bead has a volume capacity of about 1.3 mmol/mL or less.

29. The process of claim 27 or 28, wherein the crosslinked polymeric bead comprises a poly(vinylbenzylchloride) bead.

30. The process of claim 27 or 28, wherein the crosslinked polymeric bead comprises a poly(glycidyl methacrylate) bead.

31. The process of claim 27 or 28, wherein the crosslinked polymeric bead comprises a chloromethylated polystyrene bead.

32. The process of any one of claims 27-29, wherein the functional groups on the crosslinked polymer bead are haloalkyl groups.

33. The process of any one of claims 27, 28, and 30, wherein the functional groups on the crosslinked polymer beads are epoxy groups.

34. The process of any one of claims 27-33, comprising producing a chloride form of protonated N-methyl-D-glucamine.

35. The process of any one of claims 27-33, comprising producing a sulfate form of protonated N-methyl-D-glucamine.

36. A bead produced by the process of any one of claims 27-35.

37. A system for treating arsenic-containing aqueous fluid comprising:

a bed comprising crosslinked polymeric beads each bead having bound chelate-forming groups, and a volume capacity of about 1.5 mmol/mL or less and/or a nitrogen content on a dry weight basis of about 2.4 mmol/g or more, wherein the chelate-forming groups comprise protonated N-methyl-D-glucamine, and have the capability of forming a chelate with As(V) and/or compounds thereof.